

Name: _____

Measuring Sound Waves and Echoes

Describe an echo that you remember: _____

Experimenting with Echoes

Procedure:

1. Mark three distances from the wall: 50 m, 100 m, and 150m. Time how long it takes the sound to travel from one person's mouth to the wall and echo back. Do three trials at each distance and find the average.

Trial	50 meters (Time in sec.)	100 meters (Time in sec.)	150 meters (Time in sec.)
1			
2			
3			
Average			

Answer these questions based on your data:

At which distance was the time the shortest? _____

At which distance was the time the longest? _____

If you stand 100 meters from the reflecting wall, what is the total distance that a sound will have to travel before the echo is heard? _____

2. Mapping the ocean floor using SONAR. This table shows how long it took sound waves to reach the ocean floor and return to the surface. Calculate the depth of the ocean floor as determined by the time.

Example calculation: How many meters will sound travel in water if it takes the sound 0.20 sec to go to the bottom and be reflected to the top? Sound travels 1500 m per second in ocean water.

$$? \text{ m} = 0.20 \text{ sec} \times 1500\text{m/sec} = 300 \text{ meters total distance}$$

Since the sound traveled from the surface to the bottom and back again, divide this distance by 2 to find the depth of the ocean floor or sunken object. $300 \text{ meters} / 2 = 150 \text{ meters}$.

Site	Time (seconds)	Speed of sound in water (meters/second)	Divided by 2	Equals Depth (meters)
1	0.20	1,500	2	150
2	0.15	1,500	2	
3	0.25	1,500	2	
4	0.30	1,500	2	
5	0.43	1,500	2	

3. Make a graph of the part of the ocean floor that you have just identified using SONAR. Label the left axis with the depths from 0 – 400 m.

Depth (m)					
Site	1	2	3	4	5

